Preclinical Development and First-In-Human Testing of GRNCM1 in Advanced Heart Failure

Grant Award Details

Preclinical Development and First-In-Human Testing of GRNCM1 in Advanced Heart Failure

Grant Type: Disease Team Therapy Planning I

Grant Number: DR2-05434

Investigator:

Name:	Jane Lebkowski
Institution:	Geron Corporation
Type:	PI

Disease Focus: Heart Disease

Award Value: $0

Status: Closed

Grant Application Details

Application Title: Preclinical Development and First-In-Human Testing of [REDACTED] in Advanced Heart Failure

Public Abstract: This application seeks to bring to the clinic a new treatment for myocardial disease based on human embryonic stem cell (hESC) derived cardiomyocytes. hESC-cardiomyocytes have the unique potential to address the underlying cause of heart disease by repopulating areas of damaged myocardium (heart tissue) with viable cardiac cells. This therapeutic approach represents a potential breakthrough in heart disease treatment, serving one of the most intractable, largest, and most costly unmet clinical needs in the U.S.

Currently available heart disease treatments have demonstrated ability to slow progression of the disease, but to date none can restore the key underlying defect in heart failure, a loss of contractile function. Cell therapy approaches have generated excitement for their unique potential to play a curative role in myocardial disease through the restoration of lost contractile and/or circulatory function. hESC-cardiomyocytes are unique amongst the cell therapy approaches in that they are a human cardiomyocyte (heart muscle cell) product; replacing damaged myocardium with viable heart cells which can integrate and form fully functional cardiac tissue. This approach has the potential to significantly halt or reverse cardiac functional decline. These benefits can significantly impact patient medication requirements and hospitalizations associated with ongoing cardiac decline, key drivers of the enormous health care costs associated with heart failure.

The proposed scope of this project includes activities leading up to and including a regulatory filing with the FDA to initiate clinical testing of hESC-cardiomyocytes for the treatment of heart failure, as well as the enrollment and initial follow-up of a small cohort of patients in a first-in-human trial. The proposed product has completed extensive process development, product characterization, and preclinical (animal model studies) proof-of-concept studies to date. The scope of the proposed research includes: (i) performance of key preclinical safety and efficacy studies to enable entry to clinical testing (ii) manufacture of material for use in preclinical studies, development work, and clinical testing (iii) development and qualification of assays for product characterization, and (iv) preparation for and execution of initial clinical studies.

Statement of Benefit to California:	The proposed project has the potential to benefit the state of California through 1) providing improved medical outcomes for patients with heart disease, 2) increasing California's leadership in the emerging field of stem cell research, and 3) preserving and creating high quality, high paying jobs for Californians. Heart disease is one of the most intractable, wide-spread, and fatal diseases in the U.S. More than 5.8 million Americans currently suffer from heart failure; close to 60% of heart failure patients die within 5 years of diagnosis. Although specific statistics are not available for California, they are likely similar to those nationwide, with incidence of more than 10 in 1000 individuals >65 years of age (AHA, 2010). Currently available heart disease therapies have demonstrated the ability to slow disease progression, but to date none can restore the key underlying defect leading to heart failure, a loss of cardiac contractile function. Cell therapy, an approach to regenerate or repair the damaged heart with new cells, addresses this fundamental need, and is considered one of the most important and promising frontiers for the treatment of heart disease. Although multiple other cell therapy products are currently being evaluated for the treatment of heart disease, human embryonic stem cell derived cardiomyocytes have unique potential to address the underlying defect of loss of contractile activity in heart failure, by replacing scarred or damaged heart tissue with new, functional human heart cells to restore cardiac function. California has a history of leadership in biotechnology, and is emerging as a leader in the development of stem cell therapeutics. Cutting edge stem cell research, in many cases funded by CIRM, is already underway in academic research laboratories and biotechnology companies throughout the state. The proposed project has the potential to further increase California's leadership in the field of stem cell therapeutics through the performance of the first clinical testing of an hESC-derived cardiac cell therapy. The applicant has been located in California since its inception, and currently employs nearly 200 full-time employees at its California headquarters with more than 50% of employees holding an advanced degree. These positions are highly skilled positions, offering competitive salaries and comprehensive benefits. The successful performance of the proposed project would enable significant additional jobs creation as the program progresses through more advanced clinical testing.